



## STATEMENT OF BASIS



**WEST CRAWLER PARK SITE SWMU 44  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
KENNEDY SPACE CENTER  
BREVARD COUNTY, FLORIDA**

**PURPOSE OF STATEMENT OF BASIS**

This Statement of Basis (SB) has been developed to inform and give the public an opportunity to comment on a proposed remedy to address contamination at the West Crawler Park Site (WCPS)<sup>1</sup>. A Kennedy Space Center (KSC) remediation team consisting of National Aeronautics and Space Administration (NASA), United States Environmental Protection Agency (EPA), and Florida Department of Environmental Protection (FDEP) has determined that the proposed remedy is cost effective and protective of human health and the environment. However, before implementing the proposed remedy, the KSC remediation team would like to give an opportunity for the public to comment on the proposed remedy. At any time during the public comment period, the public may comment as explained in the “How Do You Participate” section of this SB. After the end of the public comment period, the KSC remediation team will review all comments and issues raised in the comments and determine if there is a need to modify the proposed remedy prior to implementation.

**WHY IS A REMEDY NEEDED?**

The results of a Resource Conservation and

Recovery Act (RCRA) Facility Investigation (RFI) indicated that the polynuclear aromatic hydrocarbons (PAHs), PCBs, Thallium, and volatile organic compounds (VOCs) listed in Table 1 are present in site soil or groundwater and could potentially be harmful to human health.

**HOW DO YOU PARTICIPATE?**

The KSC remediation team solicits public review and comment on this SB before implementing the proposed remedy. The remedy for the WCPS will eventually be incorporated into the Hazardous and Solid Waste Amendments (HSWA) permit for the KSC.

The public comment period for this SB and proposed remedy will begin on the date of publication for notice of availability of the SB in major local newspapers of general circulation, and end

**The Cleanup Remedy**

The proposed cleanup remedy for the WCPS includes the following components:

- Natural attenuation of groundwater to remove contaminants through natural processes
- Monitoring groundwater to document water quality and contaminant levels
- Implementing institutional controls to prohibit residential use and prohibit the use of groundwater as a potable water supply

*1. In accordance with RCRA §7004(b), this Statement of Basis summarizes the proposed remedy for NASA's KSC West Crawler Park Site (WCPS). For detailed information on the site, consult the WCPS RFI Report, Long-Term Monitoring Plan, and Interim Measures Work Plan, which are available for review at the information repository located at the NASA Document Section of the North Brevard Library, 2121 South Hopkins Avenue, Titusville, FL 32780, telephone: (321) 264-5026.*

45 days thereafter. If requested during the comment period, the KSC remediation team will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy. To request a hearing or provide comments, contact the following person in writing within the 45-day comment period:

Mr. Timothy J. Bahr, P.G.  
FDEP – Bureau of Waste Cleanup  
2600 Blair Stone Road, MS 4535  
Tallahassee, FL 32399-2400

The HSWA Permit, SB, and associated administrative file, including the RFI Report, Long-Term Monitoring Plan, and Interim Measures Report will be available to the public for viewing and copying at:

NASA Document Section of the  
North Brevard Library  
2121 South Hopkins Avenue  
Titusville, FL 32780  
Telephone: (321) 264-5026

To request further information, you may contact one of the following people:

Mr. Harold Williams  
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## **FACILITY DESCRIPTION**

NASA established the KSC as the primary launch site for the space program. These operations have involved the use of toxic and hazardous materials. Under the RCRA and applicable HSWA permit (Permit No. FL6800014585) issued by the FDEP and/or EPA, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 44, the WCPS (Figure 1).

## **SITE DESCRIPTION AND HISTORY**

The WCPS is a NASA-operated facility located in the Vehicle Assembly Building (VAB) area north of the Thermal Protection System Facility (K6-794). The Crawler Maintenance Building (K6-743) exists between the north and south halves of the WCPS, which comprise the SWMU that is about 400 by 600 ft (5.5 acres). Hazardous waste staging buildings are located in each half, and both halves are within restricted-access fenced areas.

The WCPS is one of two parking areas used for parking shuttle transport vehicles (crawlers) used to transport Space Shuttles from the VAB to the complex launch pads. The roadway that the crawlers ride and park on is referred to as the crawlerway and is comprised of gravel to cobble-sized quartz river rock underlain by several feet of compacted limestone road-base material. Routine operation and maintenance of the crawlers takes place at the WCPS. Formerly,

the site was used for parking the Mobile Service Structure (MSS) used during the Apollo Program Era and was referred to as the MSS Park Site. Based on the history of operations at the WCPS, suspected sources of contamination include lubricating grease and oil, and solvents that have been used during operation and maintenance of the crawlers and the former MSS. Several remedial actions have been conducted to reduce future releases at the WCPS.

Investigations conducted at the site include:

- November 1991 to March 1992: A Preliminary Soil Contamination Survey was performed that included sampling and analysis of soil, sediment, surface water and groundwater. Grease and oil, hydrocarbons and PAHs were detected at elevated concentrations in soil and sediment samples. PCBs were also detected in soil; grease and oil and metals were detected in groundwater and surface water; and volatile organic compounds (VOCs) were detected in groundwater.
- July 1992: A Stormwater Sampling and Analysis was completed. Lead and zinc were detected at concentrations exceeding FDEP surface water standards.
- 1994-1995: An RFI Work Plan was developed outlining a phased field investigative approach.
- 1996-1999: An RFI was conducted. Samples of surface and subsurface soil, sediment, surface water, and groundwater were collected and analyzed. Results of these analyses were used to determine potential increased human health and ecological risks. Unaccep-

table risks to potential human and ecological receptors were identified in the RFI for soil, groundwater and sediment at the WCPS.

- 2000: A long-term groundwater monitoring plan was developed for the WCPS. The plan includes sampling monitor wells for analysis of VOCs and has been implemented as an interim corrective measure (ICM). Data suggests that natural attenuation by reductive dehalogenation of VOCs in groundwater is occurring.
- 2001: An ICM Work Plan for sediment excavation was developed to address ecological concerns. Sediments in the ditch west of the WCPS have been removed and replaced with clean fill to eliminate potential impacts to the downstream Banana Creek, a designated Outstanding Florida Waterway (OFW).
- 2000-2001: Additional risk assessment work was performed to evaluate potential risks to human health for current and future receptors that may be exposed to contaminants in site soils. Because total recoverable petroleum hydrocarbons (TRPHs) were detected in four of 16 samples at concentrations exceeding FDEP/EPA cleanup target levels for industrial use sites, additional samples were collected for evaluation of on site worker risk associated with exposure to TRPH fractions. Additionally, soil samples were collected for analysis using FDEPs synthetic precipitation leaching procedures to verify that TRPHs and metals are not leaching to groundwater. Laboratory data indicated that TRPH fractions do not pose a risk to human health and leaching to groundwater is not occurring.

## SUMMARY OF SITE RISK

As part of the RFI activities, a Human Health Risk Assessment (HHRA) was performed in accordance with KSC's remediation team-developed Risk Assessment Decision Process Document for KSC, Florida and EPA guidance (RAGS, EPA 1989 and subsequent EPA Region 4 Guidance). An ecological risk assessment (ERA) was performed in accordance with the EPA's "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments" dated 1997.

Chemicals of Concern (COCs) identified for human health during the RFI and supplemental sampling activities that are above EPA/FDEP cleanup target levels include:

- Groundwater: Chlorinated VOCs.
- Soil: PAHs, PCBs, and thallium

The HHRA showed the estimated excess lifetime cancer risk for the hypothetical future child resident exposed to soil to be about 7 in a million and future adult resident exposed to groundwater to be 2 in 1,000, which is above EPA's acceptable range of 1 in a million to 1 in 10,000 and FDEP's risk goal of one in a million. The main contaminants contributing to cancer risk are PAHs and PCBs in soil, and vinyl chloride in groundwater.

The partial ERA Step 3 of EPA's eight-step ERA process did not identify any unacceptable ecological risks at or near the site following ditch sediment removal.

## WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objectives (RAO) are to: (1) protect humans from exposure to groundwater by (a) preventing its use as a drinking water source in the shallow aquifer where contaminant concentrations are higher than cleanup target levels, and (b) to achieve groundwater cleanup; and (2) protect humans from exposure to soil by limiting access where concentrations exceed residential risk-based criteria and are above background concentrations. Table 1 lists the COCs above cleanup target levels at the WCPS. The groundwater data are based on a complete round of samples collected in October 2001. The first column lists the chemical name, the second column lists the range of concentrations detected in groundwater and soil present at WCPS, and the last column presents the FDEP/EPA cleanup target level to be achieved at the site.

Table 1

Site-Related Chemicals of Concern (COCs)	Range of Detections	Site-Specific Cleanup Level <sup>2</sup>
Groundwater (ug/l) <sup>1</sup>		
Vinyl Chloride	1.6 to 27.5	1
Soil (mg/kg)		
PAHs <sup>3</sup>	0.022 to 0.30	0.1/0.5
PCBs	0.0058 to 0.6	0.5/2.1
Thallium	0.29 to 5.3	0.5/14.3

1. Samples collected in October 2001.
2. Florida Administrative Code 62-777. Groundwater cleanup target levels and soil cleanup target levels for residential/ industrial exposure except thallium, which is an EPA risk-based concentration (noSCTL).
3. Carcinogenic PAHs as represented by Benzo(a)pyrene concentrations.

## REMEDIAL ALTERNATIVES FOR THE WCPS

Because of the very low level of ground-water contamination and isolated nature and level of the soil contamination, only one remedy was considered for the WCPS.

***Land Use Controls and Natural Attenuation with Long-Term Monitoring:*** Natural processes such as biological degradation, dispersion, advection, and adsorption will reduce COC concentrations to cleanup levels over time. Groundwater will be regularly sampled and analyzed to monitor and document the decrease in contaminant concentrations. Data collected during the RFI indicated that biodegradation will likely reduce contaminant concentrations below cleanup levels within five years. In the long term, this alternative will meet the RAOs for groundwater and will also allow reevaluation to determine if the remedy is working and provide an opportunity for change, if necessary. In addition, institutional LUCs will be implemented to limit access to the site by individuals other than industrial workers and to prevent the use of groundwater as a drinking water source. NASA, EPA and the FDEP have entered into a Memorandum of Agreement (MOA) that outlines how institutional controls will be managed at NASA<sup>2</sup>. The MOA requires periodic site

inspection, condition certification and agency notification. The soil and ground-water use control areas are shown on Figures 2 and 3.

## EVALUATION OF REMEDY

The selected remedy was evaluated to determine if it will comply with EPA's four threshold criteria for corrective measures. The criteria are:

- overall protection of human health and the environment;
- attain media cleanup standards;
- control the sources of releases; and
- comply with standards for management of wastes.

Land Use Controls and Natural Attenuation with Long Term Monitoring meet each of the threshold criteria and were determined by the KSC Remediation Team to be the best overall approach.

## WHAT IMPACTS WOULD THE REMEDY HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the local community because groundwater is not used for potable water in the vicinity of the site. The natural attenuation and long-term monitoring alternative includes

*2. By separate MOA effective February 23, 2001, with the EPA and FDEP, KSC, on behalf of NASA, agreed to implement Center-wide, certain periodic site inspection, condition certification and agency notification procedures designed to ensure the maintenance by Center personnel of any site-specific LUCs deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the Center's substantial good faith compliance with the procedures called for herein, reasonable assurances would be provided to EPA and FDEP as to the permanency of those remedies which included the use of specific LUCs.*

*Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by NASA KSC, EPA and FDEP that the contemplated permanence of the remedy reflected herein shall be dependent upon the Center's substantial good faith compliance with the specific LUC maintenance commitments reflected herein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.*

administrative actions to limit the use of groundwater until cleanup levels have been reached. In addition, the administrative actions will limit the site to industrial use to limit exposure to site soils.

#### **WHY DOES THE KSC REMEDIATION TEAM RECOMMEND THIS REMEDY?**

The team recommends the proposed remedy because the natural attenuation processes occurring at the site are sufficient for the removal of low concentrations of VOCs. The long-term monitoring will be used to monitor and document reduction in contaminant concentrations to the cleanup target levels. The institutional controls will also prevent exposure to contaminants prior to the cleanup levels being achieved. The proposed remedy meets EPA's four threshold criteria for corrective measures and was determined to be the best overall approach.

#### **NEXT STEPS**

The KSC Remediation Team will review all comments on this SB to determine if the proposed remedy needs to be modified before implementing and before incorporating the proposed remedy into KSC's HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then a Land Use Control Implementation Plan will be developed to incorporate the institutional controls at this site.

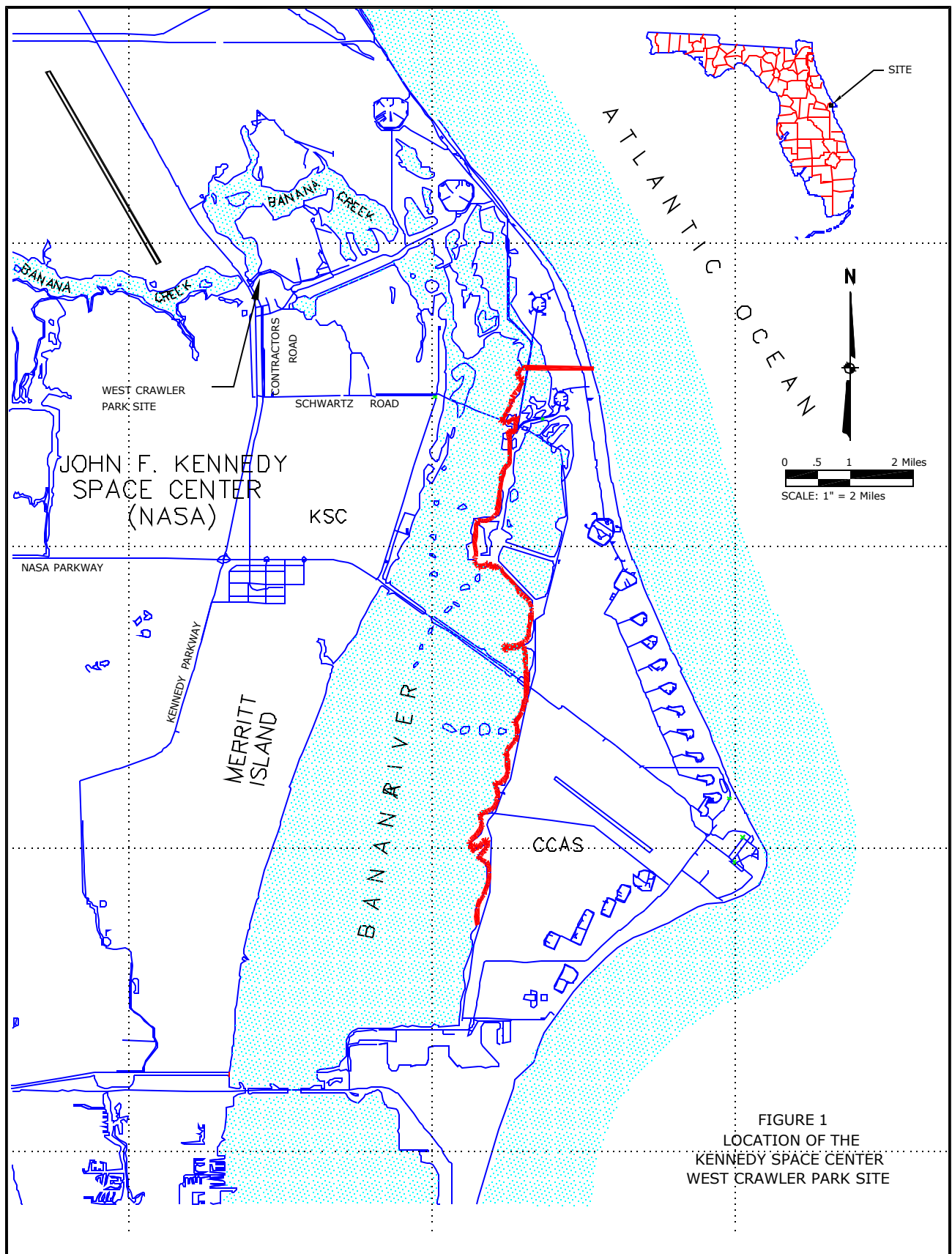


FIGURE 1  
LOCATION OF THE  
KENNEDY SPACE CENTER  
WEST CRAWLER PARK SITE

